ASTHMA

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OBJECTIVES

- Pathophysiology
- Diagnosis
- Classification
- Chronic Treatment
- Acute Treatment
- Follow-up

DIAGNOSIS

- Clinical diagnosis supported by objective tests
- 3 Key aspects of history
  Episodic symptoms
  Obstruction
  reversible (even partially)
  Exclude other diagnoses

HISTORY and PHYSICAL

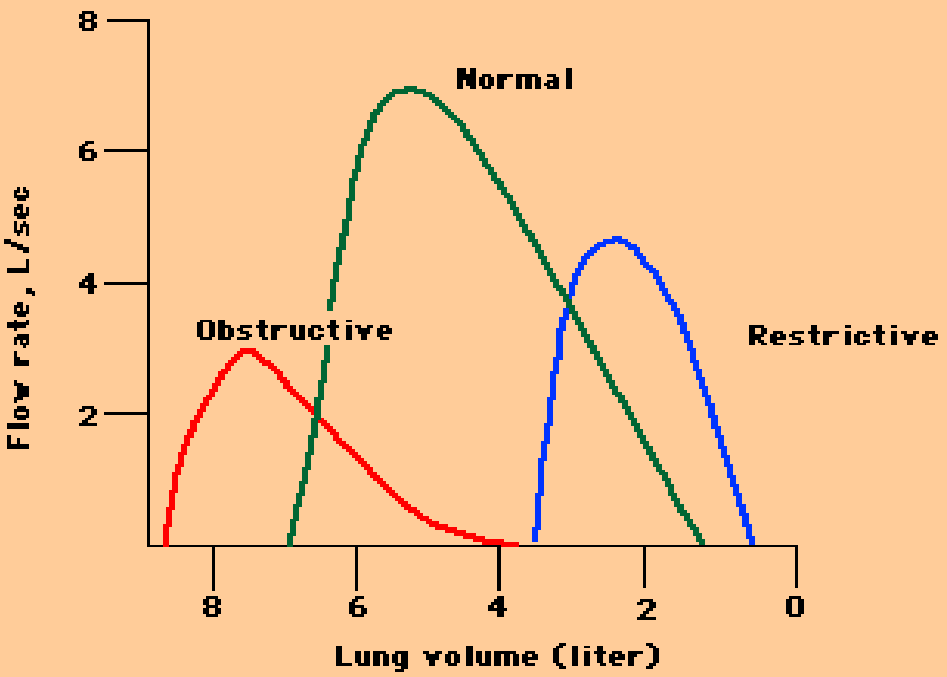
- Cough
- Dyspnea
- Family history atopic diseases
- Patterns of symptoms
- Diurnal pattern
- Activity levels and effects
- Home environment
- Other allergies
- Breath sounds
- Prolonged exhalation phase
- Nasal polyps
- Nasal secretions
- Serous Otitis Media
- Eczema

DIFFERENTIAL DIAGNOSIS

- Bronchitis
- Bronchiolitis
- Pneumonia
- Cystic Fibrosis
- Viral Infections
- Foreign body
- Tracheal stenosis
- Laryngeal webs
- Pulmonary embolus
- Congestive heart failure
- Valvular disease
- Lymphadenopathy
- Gastroesophageal reflux
- Pulmonary eosinophilia

SPIROMETRY

- Usually desired before and after bronchodilators
- Usual pattern is decreased FEV1 and normal ratio of FEV1/FVC
- Limitation in children <5-6 yrs
- Reversibility significant if >12% or 200 ml in FEV1



Flow-volume curves in obstructive and restrictive lung disease
Sample flow-volume curves during a maximal forced expiration in normals and in obstructive and restrictive lung disease. The normal expiratory portion of the flow volume curve is characterized by a rapid rise to the peak flow rate, followed by a nearly linear fall in flow as the patient exhales toward residual volume. With obstructive disease, maximal expiration begins and ends at higher lung volumes and lower flow rates than normal. With restrictive disease, the lung volumes and flow rates are reduced but the flow in relation to lung volume is actually higher than normal.

Diagram courtesy of UpToDate 2004.

PEAK FLOW

- Diurnal variation
- Lowest peak flow is first morning awakening prior to bronchodilator
- Highest is between 1200-1400 after bonchodilator
- 20% change suggests suggests asthma

OTHER TESTS

- Bronchoprovocation– methacholine challenge-- helpful if NEGATIVE
- Diffusing Capacity (DLCO)
- Chest X-Ray
- Allergy tests
- UGI/pH probe/EGD

INITIAL ASSESSMENT

- Frequency of symptoms
- Use of bronchodilator
- Nocturnal symptoms
- Atopic disease
- Activity level
- Exacerbations
- Home peak flow
- Medications (compliance and side effects)
- Triggers
- Support system
- Spacer use

CLASSIFICATION

Severe Persistent	Constant Sx Limits activity	Frequent Night Sx	FEV1<60 % PEF >30% variable
Moderate Persistent	Daily sx Many exac	Night Sx >1/week	FEV1<80 % PEF >30%
Mild	Sx	Night Sx	FEV1>80

TRIGGERS

- Exposures-smoke, heating, occupational, hobbies, pollution, strong smells
- Rhinitis
- Chronic sinusitis- consider if frequent exacerbations and no other clear trigger
- GERD- treat empirically, surgery can be beneficial to control asthma
- Drugs- beta-blocker, NSAIDs, sulfites

TRIGGERS

- Cold weather
- Exercise
- Upper respiratory infections
- Emotion
- Puberty

ALLERGIC RHINITIS

- Allergic patients have harder to control asthma until control allergies
- Avoidance of allergens
- Role of empiric medication
- Role of skin testing
- Food not common precipitant
- Immunotherapy

MEDICATIONS

- Steroids
- Beta-agonists
- Cromolyn
- Methylxanthines
- Leukotriene modifiers
- Anticholinergics

CORTICOSTEROIDS

- Proven most effective benefit for chronic control
- Inhaled form preferred
- Inhibit inflammatory cell migration and activation
- Decrease airway responsiveness
- Reverse beta-receptor down regulation
- Improve spirometry

CORTICOSTEROIDS

- Side effects include thrush, cough, dysphonia
- Dexamethasone not included
- Risks for children and growth suppression not an issue
- Used for any classification
- Systemic steroids reserved for severe

CROMYLYN/NEDOCROMIL

- Anti-inflammatory effect from blockage of chloride channels for mast cells
- Help inhibit allergy response and exercise response
- Proven to improve improve peak flow and reduce beta-agonist use
- Dosage usually 4 times per day
- Safety well known
- Less predictable response than corticosteroids

LONG ACTING BETA AGONISTS

- Not to be used for acute exacerbations
- Directly stimulates beta receptors to relax bronchial smooth muscle
- Especially useful for nocturnal symptoms
- Studies show that tolerance does not develop
- Can cause tachycardia, hypokalemia, prolonged QT interval

METHYLXANTHINES

- Theophylline, for example
- ? Mechanism but does provide mild bronchodilation
- Not the preferred chronic therapy
- Numerous adverse effects, risk of toxicity, drug interactions, and lab monitoring

LEUKOTRIENE MODIFIERS

- Use in children now widely approved for asthma in children over 12 months (for SAR over 2 years)
- Few side effects-reported liver effects
- Drug interactions with theophylline, warfarin, terfenadine
- Oral formulations once daily
- Work to decrease leukotrienes and decrease inflammation
- Studies mostly on mild asthma-improves sx and increase peak flow

QUICK RELIEF DRUGS

- Short acting beta-agonist work within 30 minutes
- All asthma patients should have this available
- Anticholinergics can give relaxation of bronchial smooth muscle-no role in long term management

STEPWISE APPROACH

Severe Persistent	High dose corticosteroid Long acting bronchodil. Oral steroids
Moderate Persistent	Anti-inflammatory Long acting bronchodil.
Mild Persistent	Anti-inflammatory or

ASTHMA ACTION PLAN

- Cutoffs of 50 and 80% are arbitrary
- May need to change zones according to history

Remember to reassess if control improved or when children grow

ASTHMA ACTION PLAN

- GREEN 80-100%
  daily regimen
- YELLOW 50-80%
  Give directions for bronchodilator
  ? home steroids
- RED <50%
  Give directions for bronchodilator, steroids Prompt medical care

PERIODIC ASSESMENT

- Individualize Follow-up
- History includes symptoms, function, control of other medical problems
- Vaccine status
- Recent exacerbations
- Medication
- Peak flow and need for spirometry

HOME PEAK FLOW

- Personal best is the best reference
- Best when used in moderate or severe asthma
- ? Benefit in mild asthma
- Consider in those who have labile control
- Children-constant reevaluation secondary to growth
- Using same meter vs changing

SPIROMETRY

- Initial diagnosis/assessment
- After starting treatment and home peak flow stable
- Every 1-2 years or following growth in children

REFERRAL

- Life threatening exacerbations
- Not meeting goals
- Diagnosis not clear cut
- Other complicating conditions
- More education needed
- Allergies/Immunotherapy
- Younger than age 3
- ? Occupational exposures

FINAL CONSIDERATIONS

- Education-MDI technique
- Vaccine status
- Reevaluate if asthma suddenly worse or harder to control
- Clinic staff roles for education and follow-up
- Overprints/forms for follow-up
- Need for calcium for women/children

?????